2001-2002 Influenza Summary
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2001-2002 Missouri Influenza Season

Influenza A (H3N2) predominated the 2001-02 influenza season in Missouri and the impact was moderate to severe in comparison to the mild predominately influenza A (H1N1) season of 2000-01. Laboratory confirmed influenza reported in Missouri 2001-02 (4,115 cases) was higher than in 2000-01 (1,896 cases) and in 1999-00 (3,820 cases) (see figure 1).

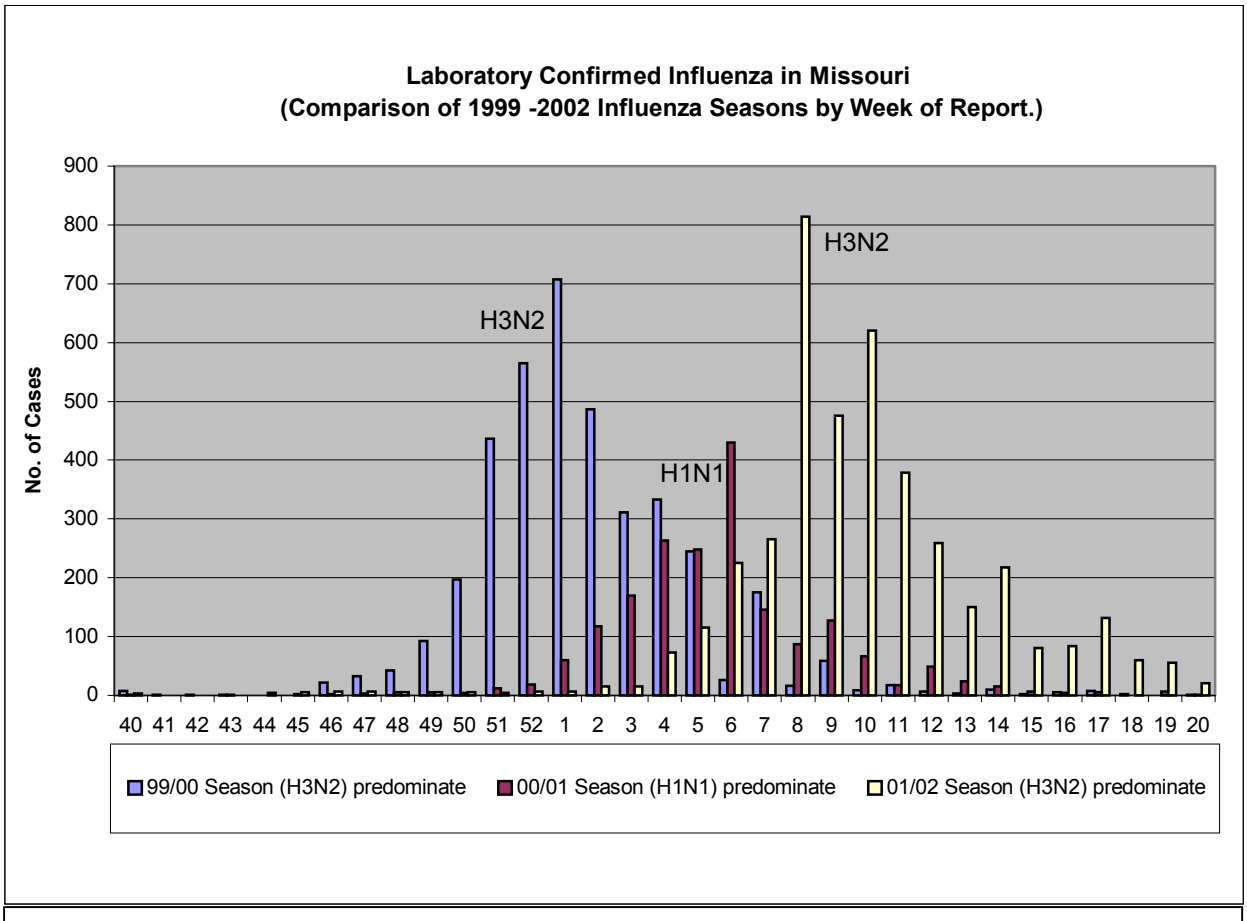


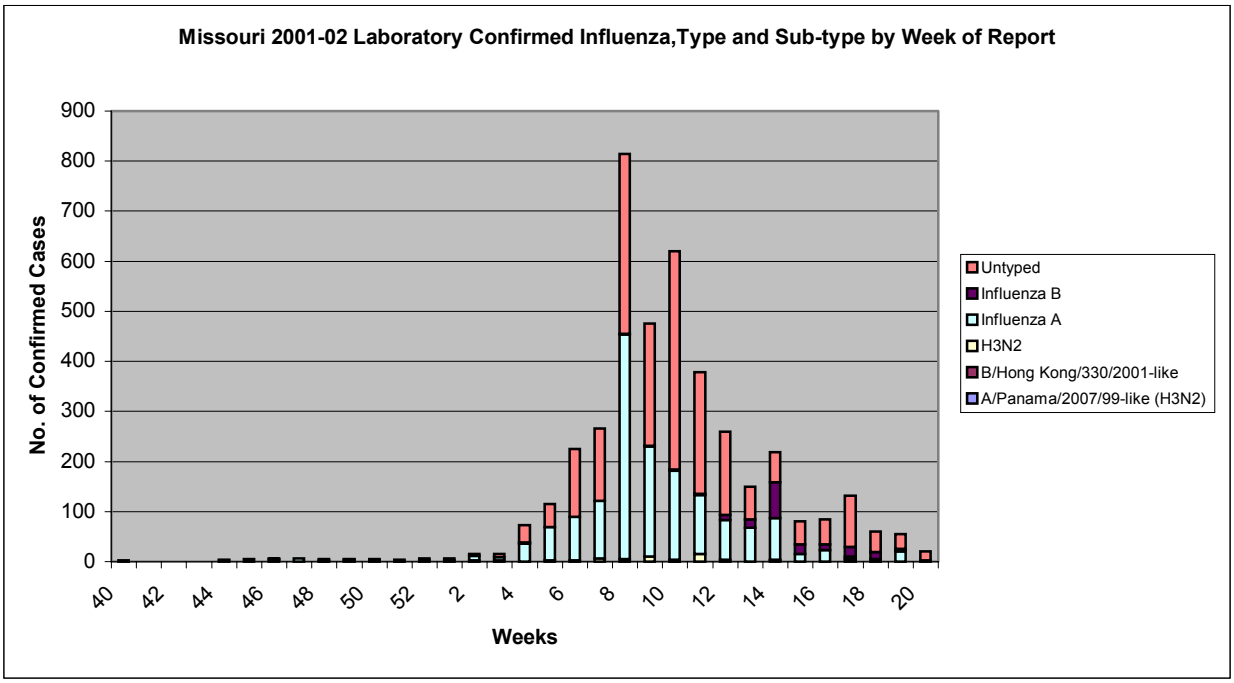
Figure 1. Laboratory Confirmed Influenza in Missouri (Comparison of 1999 -2002 Influenza Seasons by Week of Report.)

The 2001-02 influenza season began later and continued beyond the typical mid-May season. On October 2, 2001, three female college students were diagnosed with influenza by their physician based on the clinical presentation and by positive influenza *rapid* tests. Respiratory specimens from these patients were forwarded immediately to the Missouri State Public Health Laboratory (SPHL) for viral culture testing, which is considered the gold standard in influenza virus testing. These viral culture results were negative. The Missouri Department of Health and Senior Services (DHSS) subsequently received 4-6 positive reports of influenza by *rapid* tests each week between October 21, 2001 and the first week of January 2002. On January 7, 2002, a 21-year-old female from Boone County saw her physician for influenza-like illness. Her physician forwarded the respiratory specimen to the SPHL. On January 17, 2002, this specimen revealed influenza type A, sub-type (H3N2) by the viral culture method. The isolate was subsequently forwarded to The 'Centers of Disease Control and Prevention' (CDC), where it was antigenically characterized by hemagglutination-inhibition using post-infection ferret antisera. CDC reported the results of this specimen as antigenically related to A/Panama/2007/99-like (H3N2). A/Panama/2007/99 is antigenically similar to the A/Moscow/10/99 virus, which evolved from A/Sydney/5/97, and was the WHO recommended H3N2 component of the 2001-02 influenza vaccine. The last laboratory confirmed (by viral culture) case of Influenza A in Missouri was diagnosed on April 30, 2002; the last laboratory confirmed case of Influenza B was diagnosed on June 14, 2002; while the last case of untyped influenza in Missouri was diagnosed on June 12, 2002 by *rapid* test method.

Laboratory-Confirmed Influenza Cases

There were 4,115 laboratory-confirmed cases of influenza reported in Missouri between October 1, 2001 and the week ending May 18, 2002 (see figure 2). Of the 4,115 laboratory

confirmed cases, 1,675 (41%) were type A. Of those, 81 were sub-typed as influenza A (H3N2), and of those 11 were antigenically characterized by CDC as A/Panama/2007/99-like (H3N2). There were 186 (5%) laboratory-confirmed cases of influenza B, of which five were antigenically characterized as B/Hong Kong/330/01-like. The remaining 2,254 (54%) laboratory confirmed cases were detected by the influenza *rapid-testing* method without type differentiation.



The 2001-2002 influenza season began with the three positive *rapid* test method influenza reports during week 40 (week ending October 6, 2001). The number of reported laboratory confirmed cases remained below seven per week until a slight increase to 15 during week 02 (week ending January 5, 2002). Significant increases became apparent during week 04 (week ending January 26, 2002). Reports of laboratory confirmed influenza cases rose sharply through weeks 05, 06, and 07 (week ending February 16, 2002), then peaked during week 08 (week ending February 23, 2002). During week 09 (week ending March 02, 2002), laboratory

confirmed influenza cases dipped significantly but increased sharply once again during week 10 (week ending March 9, 2002). From week 11(week ending March 16, 2002), the number of reported laboratory confirmed influenza generally declined in an up and down pattern through week 20 (week ending May 18, 2002). Historically, the number of reported cases typically returns to baseline by week 20, but this was not the case in Missouri this season. By date of report, cases returned to baseline in week 28 (week ending July 13, 2002).

During the 2001-02 season, the total number of laboratory confirmed influenza cases reported more than doubled the number of those reported the previous season. Although more cases were reported this year, unforeseeable differences in health care provider reporting from year to year warrants caution in interpretation of this increase (see figure 3).

Reported influenza illness in Missouri occurred almost equally among gender. Of the laboratory confirmed cases reported, 47% (1,954) were male, 48% (1,967) were female and in 5% (194) of the cases, the gender was unknown (see figure 4). Incidence of influenza in Missouri followed a characteristic pattern among the groups, typically the least immunized. Numbers were highest among those aged one to 24 years of age. Given the focus of current immunization practices targeted toward those at high risk for influenza related complications, the low incidence of laboratory confirmed cases reported among the elderly are remarkable (see figure 5).

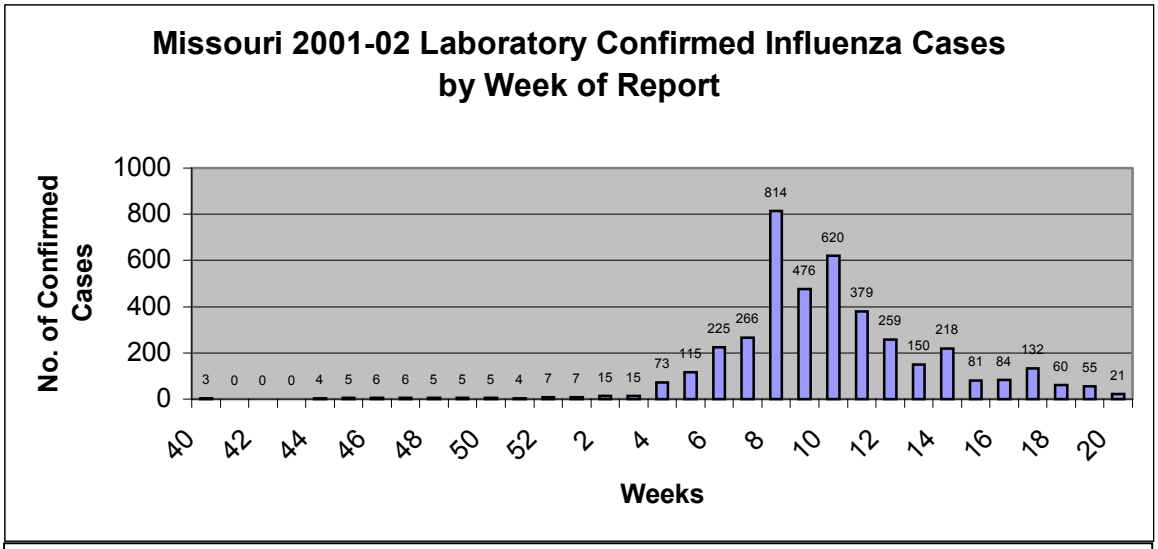


Figure 3. Missouri2001-02 Laboratory Confirmed Influenza Cases by Week of Report.

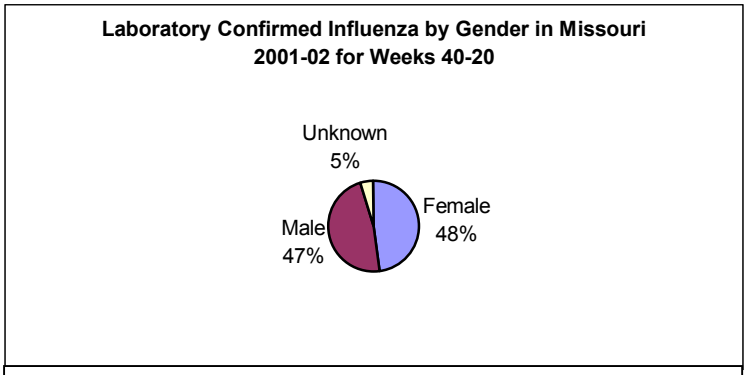


Figure 4. Laboratory Confirmed Influenza by Gender in Missouri 2001-02 for Weeks 40-20.

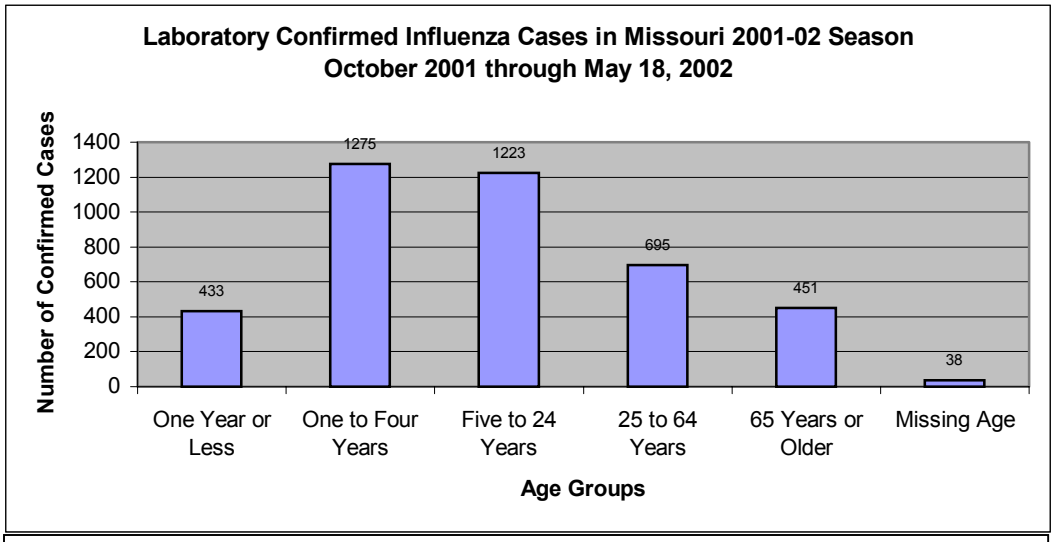


Figure 5. Laboratory Confirmed Influenza Cases in Missouri 2001-02 Season, October 2001 through May, 18, 2002.

Influenza infection rates and influenza related complications are generally high among young children. Seasonal nationwide increase in hospitalizations among children one year of age and younger can be attributed to influenza and influenza related complications. Although other respiratory viruses surface concurrently, children in Missouri were affected heavily by influenza in 2001-02. Among the laboratory confirmed cases reported in Missouri (4,115), 68% (2,783) were among those 19 years of age or younger, a 4% increase from the previous year. Furthermore, it is important to note that 42% (1,708) of the total cases (4,115) occurred in children under age five (see figure 6).

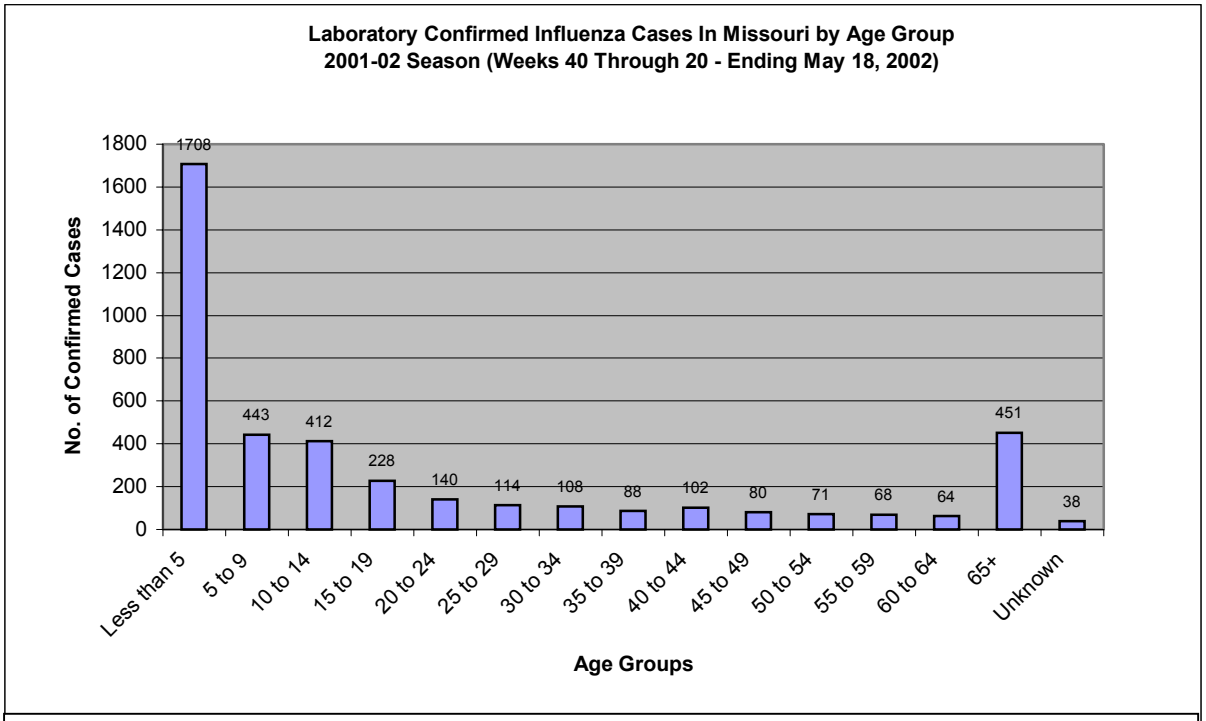


Figure 6. Laboratory Confirmed Influenza Cases in Missouri by age Group 2001-02 Season, Weeks 20-40.

Influenza –like Illness

In the past, Missouri collected influenza-like illness (ILI) data through the Missouri Sentinel Active Surveillance System (SASS) using The Centers for Disease Control and

Prevention (CDC) case definition. Following the terrorist events of September 11, 2001, a new High Alert Surveillance System (HASS) was implemented as an early detection and control system for biological or chemical terrorism. With the implementation of HASS, respiratory syndromic surveillance replaced the influenza-like illness surveillance collected through SASS, and influenza-like illness data is not available for 2001-02. However, information on flu-like illness has been added to the HASS form and is being collected since October 2002.

Missouri partners with CDC through voluntary participation in the United States Influenza Sentinel Physicians Surveillance Network (US ISPSN). Through this program, Missouri collects and reports ILI data from a representative sample of physicians statewide. Physicians report each week the total number of patients seen that week and of those seen, the number of patients seen for symptoms of ILI (case definition is fever of 100 degrees Fahrenheit or greater with cough or sore throat in the absence of a known cause). US ISPSN sites also submit a specified number of respiratory specimens to the SPHL for viral isolation and analysis. CDC publishes national and regional reports each week during the influenza season based on the information communicated to them by participating US ISPSN states. The Influenza Branch at CDC uses this information to: identify when and where influenza is circulating; identify the type of influenza that is circulating; detect alterations in the influenza viruses; track influenza-related illness; and measure the impact of influenza morbidity in the United States.

Pneumonia and Influenza (P&I) Deaths

During the 2001-02 influenza season, the numbers of pneumonia and influenza (P&I) deaths in Missouri held in an up and down pattern ranging between 10 and 48 per week until week 11 (week ending March 16, 2002). P&I deaths continued generally upward, then peaked

during week 16 (week ending April 20, 2002) with 94 P&I deaths reported that week. A seesaw pattern with a general downward trend continued throughout the remainder of the season (see figure 7). Missouri P&I deaths remained below the ten-year median except during weeks: 46, 50, 52, 11, 12, 13, 14, and 16 (see figure 8). The 2001-02 P&I mortality experience in Missouri (1193) appears to be higher than in 1999-01 (900) and 2000-01 (1188). According to CDC, the percentage of P&I deaths exceeded the epidemic threshold** nationally "for 5 consecutive weeks (weeks ending March 2 [week 9] to March 30 [week 13]). During the previous three seasons, the number of consecutive weeks during which the percentage of deaths attributed to P&I exceeded the epidemic threshold ranged from 0 to13" (weeks). The entire United States national 2001-02 influenza season summary may be reviewed in CDC's MMWR Weekly, Update: Influenza Activity --- United States and Worldwide, 2001--02 Season, and Composition of the 2002--03 Influenza Vaccine, June 14, 2002, June 14, 2002 / 51(23);503-506.

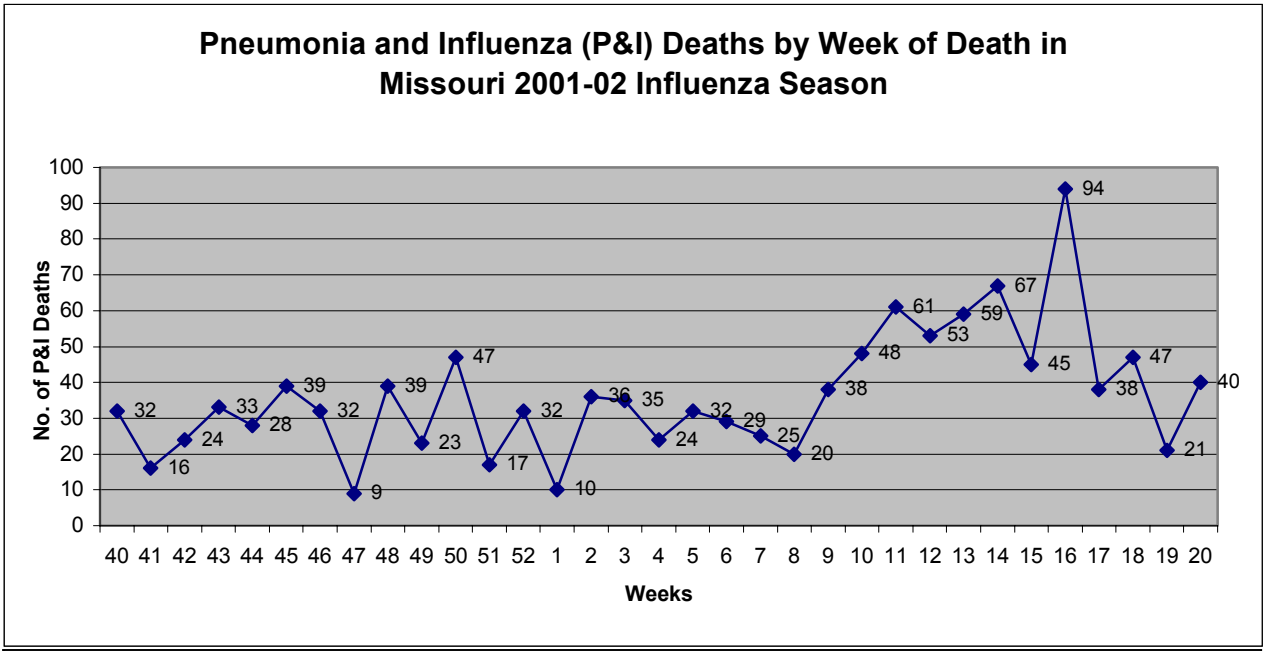


Figure 7. Pneumonia and Influenza (P&I) Deaths by Week of Death in Missouri, 2001-02 Influenza Season,Weeks 40-20.

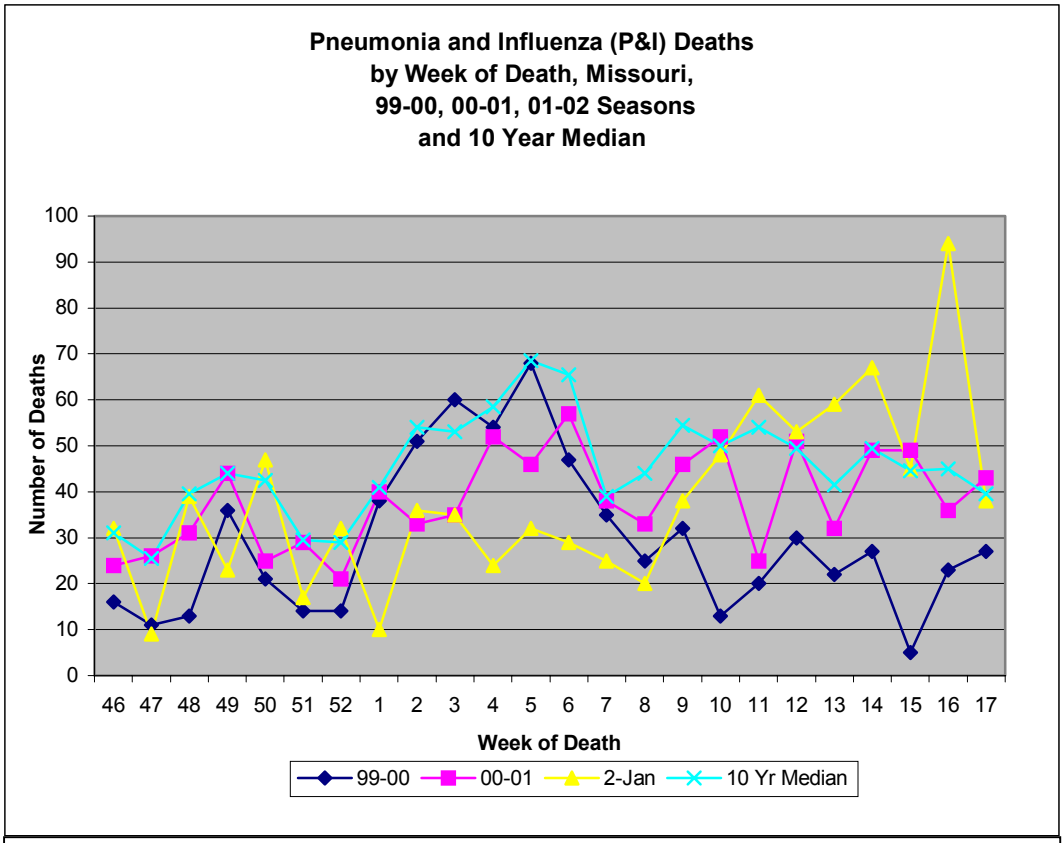


Figure 8. Pneumonia and Influenza (P&I) Deaths by Week of Death, in Missouri, 99-00, 00-01, 01-02, and Ten Year Median for Weeks 40-20.

**The expected baseline proportion of P&I deaths reported by the 122 Cities Mortality Reporting System is projected by using a robust regression procedure in which a periodic regression model is applied to the observed percentage of deaths from P&I over the previous 5 years. The epidemic threshold is 1.654 standard deviations above the seasonal baseline. Before the 1999--2000 season, a new case definition for a P&I death was introduced. During summer 2000, the baseline and epidemic thresholds were adjusted manually to account for the changes in case definition. For the 2001--02 season, sufficient data have been collected by using the new case definition to allow projection of the baseline using the regression procedure employed before the 2000--01 season. (This definition was quoted from the Update: Influenza Activity --- United States and Worldwide, 2001--02 Season, and Composition of the 2002--03 Influenza Vaccine, Weekly MMWR, June 14, 2002/51(23); 503-506.)

Outbreaks of Influenza-like Illness

The Missouri Department of Health and Senior Services (DHSS) received ten reports of influenza outbreaks in institutions and long-term care facilities during influenza season 2001-02, which is substantially higher as compared to only one reported last season.

Children in Missouri continue to be vulnerable to influenza. Laboratory confirmed reports indicate a 4% increase among the 0-19 year age group as compared to last season. As previously stated, 68% of the reported laboratory confirmed cases in 2001-02 occurred among Missourians 19 years of age or younger, and 42% occurred in children under age five. Community outbreaks of influenza were reported in three childcare facilities, of which, one was closed for a short time. In spite of this, the number of reported school closings was down. DHSS received reports of six influenza illness related school closings this season compared to 17 reported in 2000-01. School closings were reported between the fourth week of January (week ending January 26, 2002), and the third week of February and again during the third week of April (week ending April 20, 2002). Absenteeism ranged from 17 to 32%, and classes were cancelled for one to three days. Students, faculty and staff reported classic influenza symptoms including fevers of 104^0 F or higher, headache, cough, sore throat, and muscle aches. There were also sporadic reports of nausea, vomiting, diarrhea, pneumonia and hospitalizations.

2002-03 Influenza Vaccine Recommendations

The Advisory Committee on Immunization Practices (ACIP) published their recommendations for the 2002-03 influenza vaccine in April 2002. The trivalent influenza vaccine recommended for 2002-03 season includes A/Moscow/10/99 (H3N2)-like, A/New Caldonia/20/99 (H1N1)-like, and B/Hong Kong/330/2001-like antigens. For the

A/Moscow/10/99 (H2N2)-like antigen, manufacturers will use the antigenically equivalent A/Panama/2007/99 (H3N2) virus. Selection of these viral strains as vaccine components was based on the growth properties and because of their similarities those expected to circulate in the United States during the 2002-03 influenza season. ACIP recommendations indicated these vaccine strains would evoke antibody responses against influenza A (H1N1) or (H3N2) and provide protection against the influenza A (H1N2) viruses, because (H1N2) is a re-assortment of (H1N1) and (H3N2) viruses.

The full ACIP influenza vaccine recommendations for 2002-03 may be viewed in the Prevention and Control of Influenza, MMWR Morbidity and Mortality Weekly Report Recommendations and Reports, April 12, 2002/Vol. 51/No. RR-3. The Internet address for this document is: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5103a1.htm.

All data is provisional and based on 9/16/02 MOHSIS Download.